IN THE CLAIMS:

1. (Currently Amended) A method for detecting a marker in an image, comprising the steps of:

selecting one of a first marker recognition process based on a normalized correlation and a second marker recognition process based on gray value histograms;

extracting image features associated with an input image of a ROI (region of interest); and

comparing the extracted image features with a trained model associated with the selected recognition process to determine if a marker is present in the input image,

wherein if the first marker recognition process is selected, the trained model comprises at least one template image for a first template class and at least one template image for a second template class, wherein the at least one template image for the first template class is trained from one or more images of the ROI having a maker, and wherein the at least one template image for the second template class is trained from one or more images of the ROI not having the marker, and wherein the step of comparing comprises the steps of:

normalizing the template images and input image with respect to brightness;

computing a correlation between the input image and each normalized template image ~~and input image~~; and

determining if ~~that~~ a marker is present in the input image based on the computed correlations ~~if the computed correlation meets a threshold~~.

2. (Canceled)

3. (Previously Presented) The method of claim 1, wherein the step of normalizing comprises computing $I(i) = \frac{(I(i) - \mu)}{\sigma}$, where ***I(i)*** is the gray value of pixel ***I*** and where μ and σ denote the average brightness and contrast, respectively.

4. (Previously Presented) The method of claim 1, wherein the step of computing a correlation comprises computing $\rho = \sum_{allpixels} I(i) * T(i))$ where ρ comprises the correlation coefficient, ***I*** comprises the input image, and ***T*** comprises the template image.

5. (Canceled)

6. (Currently Amended) The method of claim 1, further comprising the step of computing the at least one template image for the first or second template class from an average of a plurality of template images of the first or second template class.

7. (Currently Amended) The method of claim 1, ~~wherein the step of computing a correlation further comprises computing a correlation between at least one other normalized template image and the input image; and~~ wherein the step of determining if a marker is present in the input image is based on a maximum computed correlation.

8. (Previously Presented) The method of claim 1, further comprising the step of reducing the resolution of the input image and the template image by a predetermined factor prior to the comparing step.

9. (Currently Amended) ~~The method of claim 1~~ A method for detecting a marker in an image, comprising the steps of:

selecting one of a first marker recognition process based on a normalized correlation and a second marker recognition process based on gray value histograms;

extracting image features associated with an input image of a ROI (region of interest); and

comparing the extracted image features with a trained model associated with the selected recognition process to determine if a marker is present in the input image,

wherein if the second marker recognition process is selected, the trained model comprises a sample image histogram comprising a gray value distribution of a sample image and the step of comparing comprises the steps of:

generating ~~an input~~ a local image histogram comprising a gray value distribution for each of a plurality of equal-sized sub-regions of the input image;

combining the local image histograms to form a single histogram representation;

computing a distance measure between the ~~input image~~ single histogram representation and the sample image histogram; and

determining if a marker is present in the input image based on the computed distance measure.

10. (Canceled)

11. (Canceled)

12. (Currently Amended) A program storage device readable by a machine, tangibly embodying a program of instructions executable by the machine to perform method steps for detecting a marker in an image, the method comprising the steps of:

selecting one of a first marker recognition process based on a normalized correlation and a second marker recognition process based on gray value histograms;

extracting image features associated with an input image of a ROI (region of interest); and

comparing the extracted image features with a trained model associated with the selected recognition process to determine if a marker is present in the input image,

wherein if the first marker recognition process is selected, the trained model comprises at least one template image for a first template class and at least one template image for a second template class, wherein the at least one template image for the first template class is trained from one or more images of the ROI having a maker, and wherein the at least one template image for the second template class is trained from one or more images of the ROI not having the marker, and wherein the step of comparing comprises the steps of:

normalizing the template images and input image with respect to brightness;

computing a correlation between the input image and each normalized template image ~~and input image~~; and

determining if ~~that~~ a marker is present in the input image based on the computed correlations ~~if the computed correlation meets a threshold~~.

13. (Canceled)

14. (Previously Presented) The program storage device of claim 12, wherein the instructions for normalizing comprise instructions for computing $I(i) = \frac{(I(i) - \mu)}{\sigma}$, where ***I(i)*** is the gray value of pixel ***I*** and where μ and σ denote the average brightness and contrast, respectively.

15. (Previously Presented) The program storage device of claim 12, wherein the instructions for computing a correlation comprise instructions for computing $\rho = \sum_{allpixels} I(i) * T(i))$ where ρ comprises the correlation coefficient, ***I*** comprises the input image, and ***T*** comprises the template image.

16. (Canceled)

17. (Currently Amended) The program storage device of claim 12, further comprising instructions for computing the <u>at least one</u> template image <u>for the first or second template class</u> from an average of a plurality of template images <u>of the first or second template class</u>.

18. (Currently Amended) The program storage device of claim 12, ~~wherein the instructions for computing a correlation further comprise instructions for computing a correlation between at least one other normalized template image and the input image; and~~ wherein the step of determining if a marker is present in the input image is based on a maximum computed correlation.

19. (Previously Presented) The program storage device of claim 12, further comprising instructions for the step of reducing the resolution of the input image and the template image by a predetermined factor prior to the comparing step.

20. (Currently Amended) ~~The program storage device of claim 12,~~ A program storage device readable by a machine, tangibly embodying a program of instructions executable by the machine to perform method steps for detecting a marker in an image, the method comprising the steps of:

selecting one of a first marker recognition process based on a normalized correlation and a second marker recognition process based on gray value histograms;

extracting image features associated with an input image of a ROI (region of interest); and

comparing the extracted image features with a trained model associated with the selected recognition process to determine if a marker is present in the input image,

wherein if the second marker recognition process is selected, the trained model comprises a sample image histogram comprising a gray value distribution of a sample image and the instructions for the step of comparing comprise instructions for:

generating ~~an input~~ a local image histogram comprising a gray value distribution for each of a plurality of equal-sized sub-regions of the input image;

combining the local image histograms to form a single histogram representation;

computing a distance measure between the ~~input image~~ single histogram representation and the sample image histogram; and

determining if a marker is present in the input image based on the computed distance

measure.

21. (Canceled)

22. (Canceled)

23. (Canceled)

24. (Canceled)